

Green Infrastructure Portfolio Standard

A planning and evaluation tool for a stormwater runoff retrofit program

Grand Rapids Case Study

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Michigan Green Infrastructure Conference

May 9, 2014



American Rivers
Rivers Connect Us

American Rivers

💧 American Rivers protects wild rivers, restores damaged rivers, and conserves clean water for people and nature.

💧 Since 1973, American Rivers has protected and restored more than 150,000 miles of rivers through advocacy efforts, on-the-ground projects, and an annual America's Most Endangered Rivers® campaign.

💧 Headquartered in Washington, DC, American Rivers has offices across the country and more than 200,000 members, supporters, and volunteers.



Innovate



Science



Collaborate



Advocate

Green Infrastructure Portfolio Standard (GIPS) History: EPA Region 5 Funded Pilot Project

Partners:

American Rivers

Center for Neighborhood Technology

Great Lakes & St. Lawrence Cities Initiative

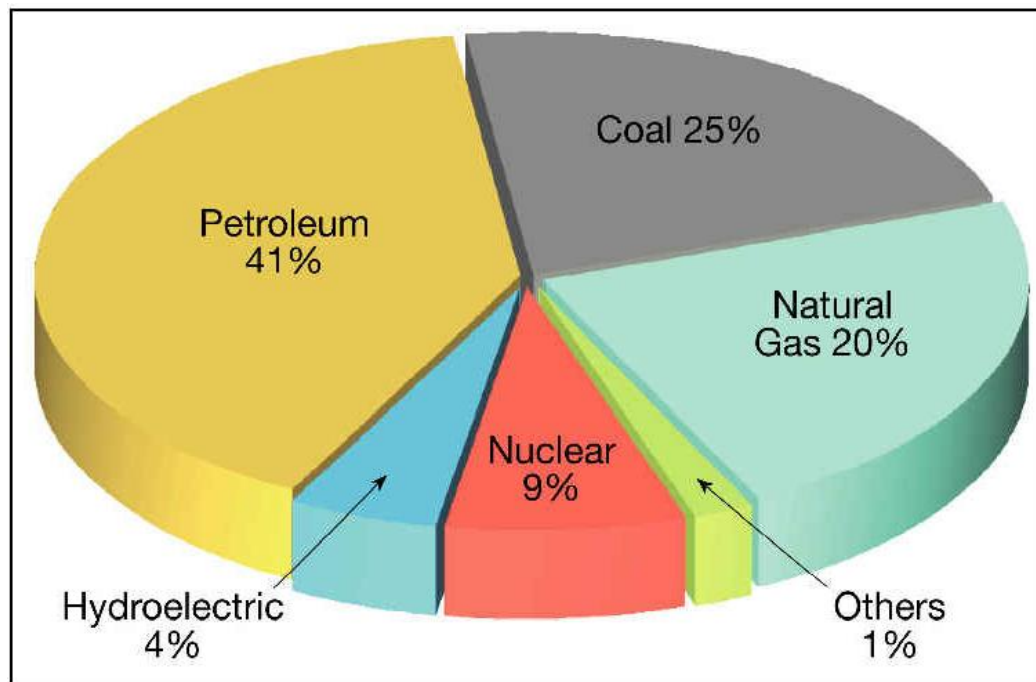
Participating Cities: Milwaukee, Wisconsin

Grand Rapids, Michigan

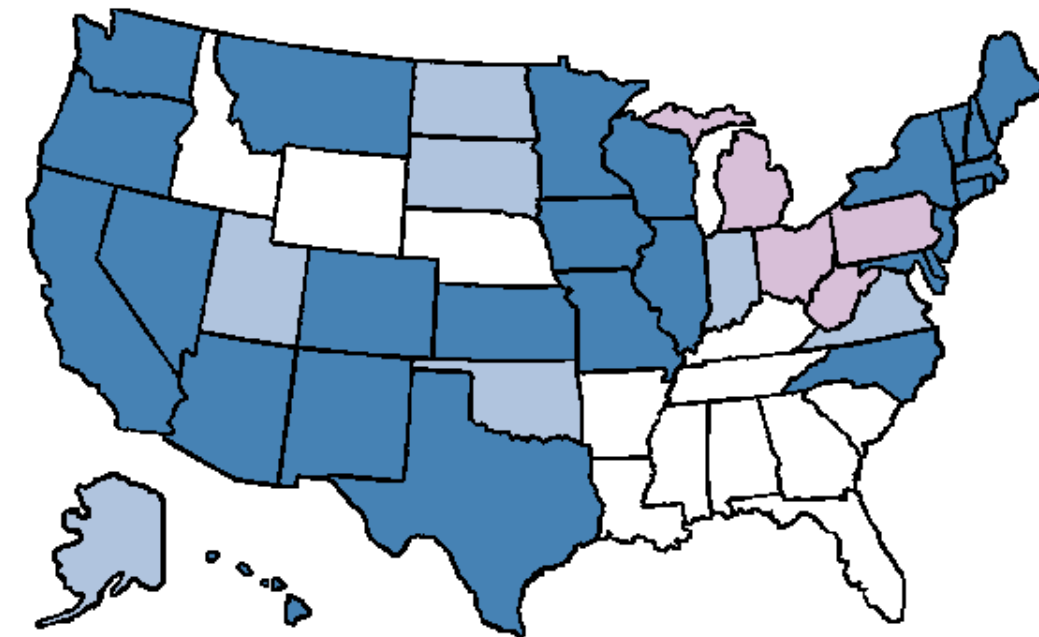
What is a Green Infrastructure Portfolio Standard?

The concept has been adapted from the “renewable energy portfolio standards” that already exist around the country.

Renewable Energy Portfolio Standard



Renewable Energy Standards

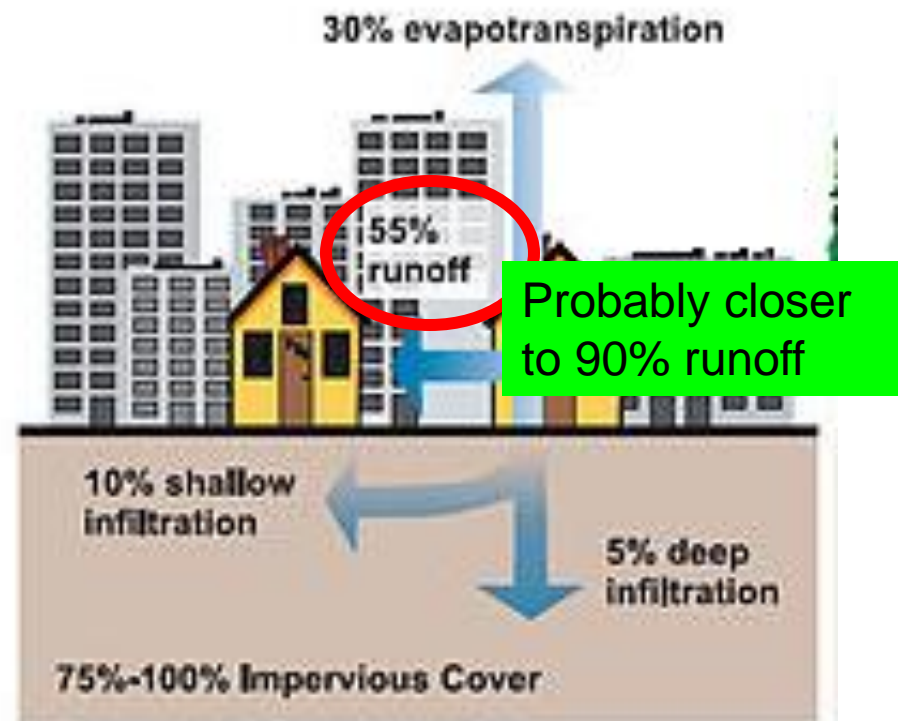
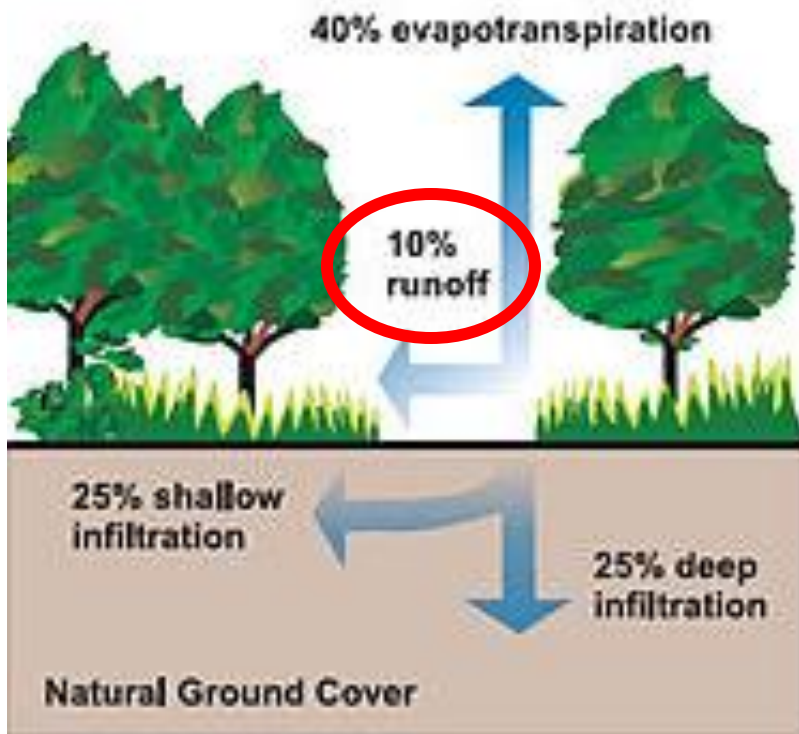


- Renewable Portfolio Standard
- Alternative Energy Portfolio Standard
- Renewable or Alternative Energy Goal

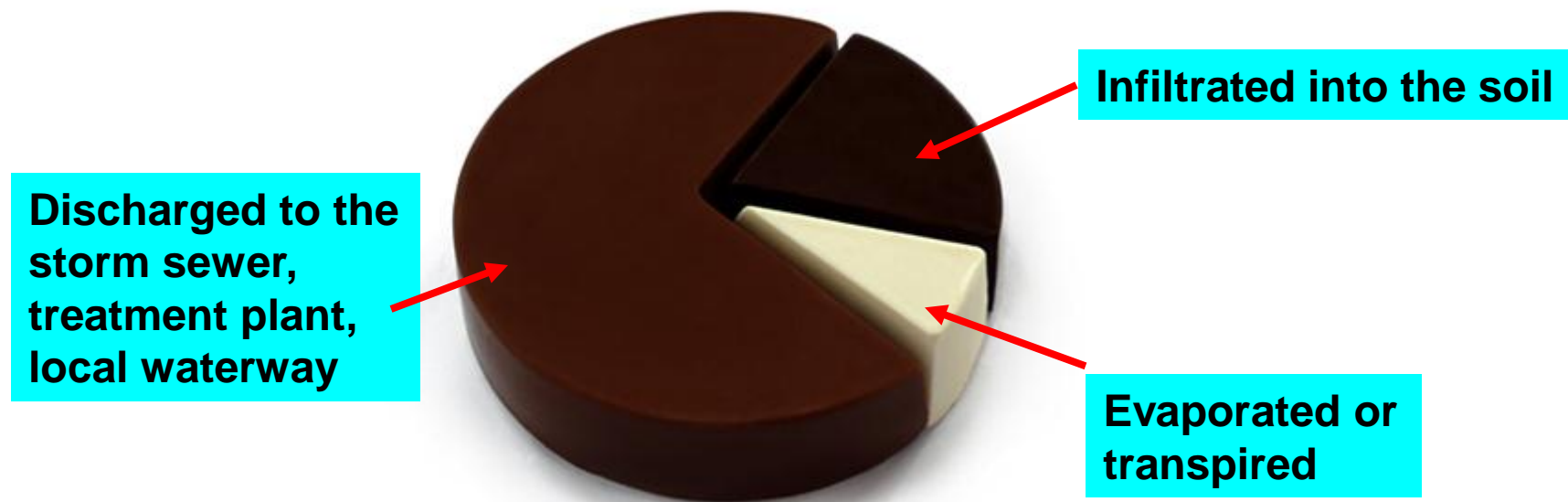
- Ohio: 25% by 2025
- Michigan: 10% by 2015
- Indiana: voluntary goal 10% by 2025

Source: Center for Climate and Energy Solutions

Stormwater Runoff – Where does it go?



Stormwater Runoff Portfolio in an Urban “Sewer Shed”



Green Infrastructure Portfolio Standard (GIPS)

Gradually increase the **retention** of stormwater runoff on sites in a developed area using green infrastructure.

- 💧 Infiltration
- 💧 Evapotranspiration
- 💧 Harvesting for reuse

Why would your municipality consider a GIPS?

- User friendly introduction to green infrastructure
- Helps offset the cost of large capital investments
- Protects the community's valuable water resources
- Practical approach to retrofitting developed land

Uses of a Green Infrastructure Portfolio Standard

Proactive retrofit program to increase retention in mature urban landscapes to reduce flooding, improve water quality and take advantage of GI's many other benefits

Reactive retrofit program to meet requirements in discharge permits and enforcement actions in a manner that is less costly than conventional approaches

Benefits to a GIPS

Advantages similar to Renewable Portfolio Standards:

- Long-term program: 10 – 20 years or more
- Small annual goals: 1% – 2% per year
- Flexible: allows use of infiltration, evapotranspiration and harvesting water for reuse
- Gives staff the ability to plan ahead, learn from experience, adjust
- Cost effective way to make progress

GIPS Process: Commit to Establishing Measurable Goals

- 💧 Reduction in runoff volume by 20% over 15 to 20 years
- 💧 Significant reduction or elimination of combined sewer overflows in a particular drainage area
- 💧 Increase in the harvesting of rainwater for reuse over several years with an ultimate goal measured in gallons per year

“Implementing GIPS allows quantification of the implementation of Green Infrastructure. When asked by the public or governing boards about progress and impact on water quality this is a tool which answers those questions in a meaningful and long term manner.”

Mike Lunn
Environmental Services Manager
City of Grand Rapids

GIPS Process: Establish a Task Force

Multidisciplinary team:

- planning
- engineering
- streets
- public works
- forestry
- stormwater management
- economic development
- community organizations
- business organizations

GIPS Process:

Selecting the project area(s)

- Size matters: neighborhood or entire municipality? Case study areas between 75 and 750 acres. [200 acres in Grand Rapids]
- “Sewer sheds”, drainage areas – helps measure progress
- Other criteria:
 - flooding or water quality issues
 - mixture of land uses
 - available GIS data
 - projects: resurfacing streets, sidewalks, alleys, parking lots; private development and redevelopment

GIPS Process: Calculating the baseline

Estimate the total annual runoff volume into the storm sewer system from the project area.

Rational Formula: $Q = C * I * A$

Where Q is the runoff volume (gallons or cubic feet)

C is the runoff coefficient

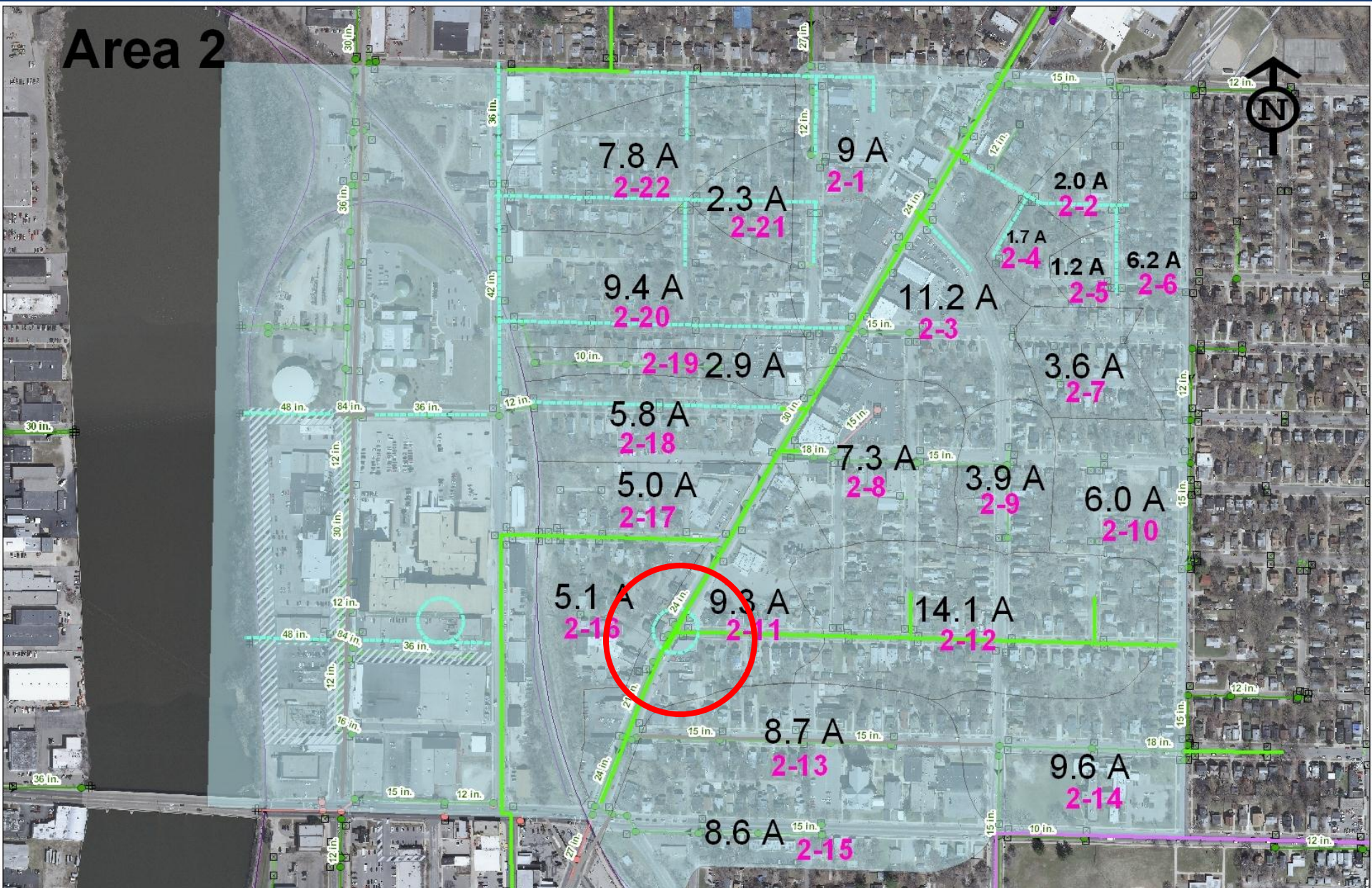
I is the rainfall intensity (1-inch rainfall of unspecified duration)

A is the area (acres)

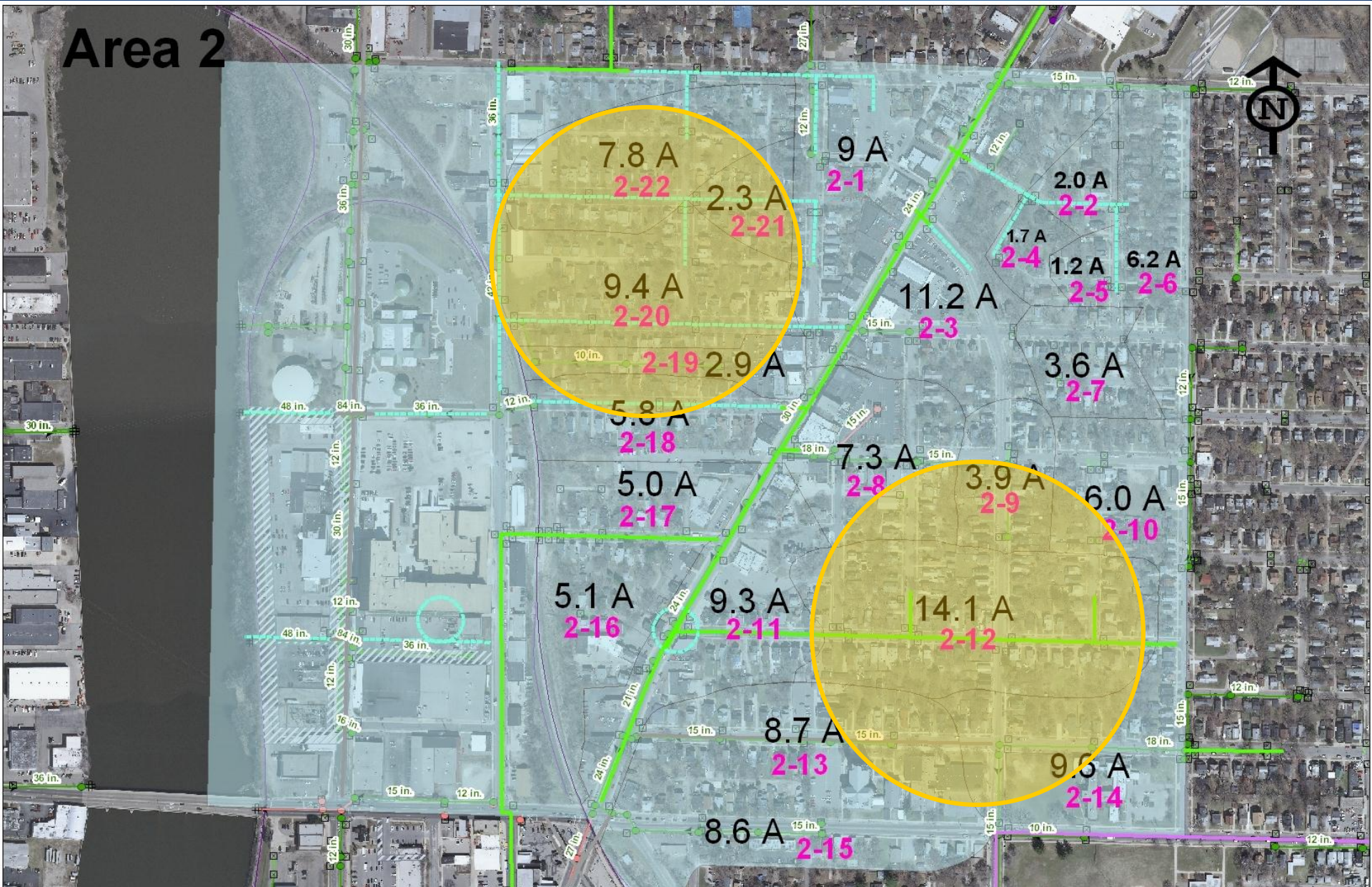
Area 2

The map displays proposed water main lines and hydrant locations for Area 2. Key features include:

- Hydrant Labels:** Various hydrant types and sizes are labeled, such as 7.8 A 2-22, 9.4 A 2-20, 5.8 A 2-18, 5.0 A 2-17, 5.1 A 2-16, 9.3 A 2-11, 14.1 A 2-12, 8.7 A 2-13, 8.6 A 2-15, 9.6 A 2-14, 1.7 A 2-4, 1.2 A 2-5, 6.2 A 2-6, 3.6 A 2-7, 6.0 A 2-10, 3.9 A 2-9, 7.3 A 2-8, 11.2 A 2-3, 2.3 A 2-21, 9 A 2-1, and 2.0 A 2-2.
- Pipe Sizes:** Pipe diameters are indicated along the lines, including 30 in., 36 in., 42 in., 48 in., 84 in., 12 in., 15 in., 16 in., 18 in., 24 in., and 27 in.
- Red Circle:** A red circle highlights a specific hydrant location near the center of the map, labeled 5.1 A 2-16.
- North Arrow:** A north arrow is located in the top right corner of the map.



Area 2



GIPS Process:

Identifying and designing GI projects

This is the heart of the program: Identify all projects (public and private) with the potential to incorporate GI elements and prepare specific GI project designs; select most cost effective options.

Hint: *Be creative! Community groups and business organizations can play an important role with this step.*

RAIN BARRELS FOR RESIDENTS

28 Acres

RAIN BARRELS FOR RESIDENTS

FLOW THROUGH BULB
OUT RAIN GARDEN;
INFILTRATION BASIN
WITH OVERFLOW TO
STORM SEWER

BULBOUT
RAIN GARDEN
(TYPICAL)

PROVIDENCE
REFORMED
CHURCH

GREEN INFRASTRUCTURE LEGEND

EXISTING CATCH BASIN
(POTENTIAL INFILTRATION BASIN)

PROPOSED INFILTRATION BASIN

AREA SEPARATED BY PROJECT

POTENTIAL TREATMENT AREA

NEW PARKWAY TREE

SURFACE FLOW DIRECTION

HYDRODYNAMIC SEPARATOR

POROUS PAVEMENT
PARKING LANE

PROPOSED PROJECT LIMITS

CENTER ISLAND RAIN GARDEN

PRIVATELY MAINTAINED
POROUS PAVEMENT

PRIVATELY MAINTAINED
RAIN GARDEN

COMMUNITY GARDEN

BULBOUT
RAIN GARDEN
(TYPICAL)

COIT AVE.

ISAAC'S
RESTAURANT

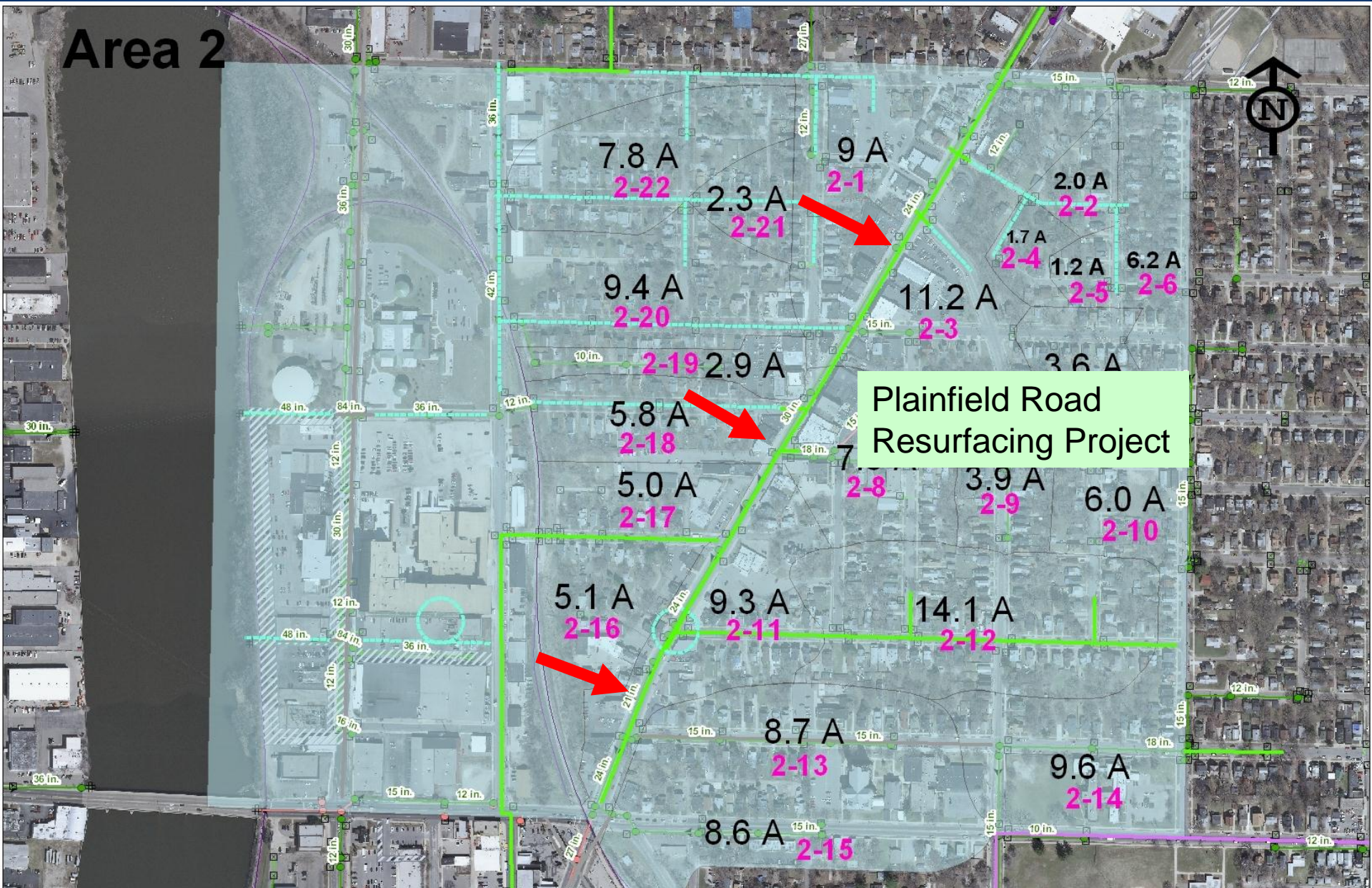
PROVIDENCE
REFORMED
CHURCH
PARKING LOT

REPLACE EXISTING BASIN
WITH INFILTRATION BASIN
(NO OVERFLOW PIPE)

PLACE INFILTRATION
BASIN WITH OVERFLOW
TO STORM SEWER
(TYPICAL)



Area 2



Grand Rapids Project Funding

Plainfield Road median bioswale project:

City secured MDOT “enhancement grant” which paid about \$146,666. Private fundraising raised \$152,220. City agreed to contribute \$30,000 to the project. Final project cost is about \$329,000.

Maintenance: City received letter of commitment from a local business association that they would maintain the island areas. This letter was included in the enhancement grant application as MDOT requires a commitment of a minimum of 20 years. The City will be maintaining the catch basin structures at the outside curb line.



GIPS Process:

Calculate retention capacity of projects

Determine:

1. Combined runoff retention capacity for GI features based on 1" storm (consistent with baseline calc)
2. Percentage of the Baseline Volume

Between 1% and 3% of Baseline (Grand Rapids)

GIPS Process:

Establish annual goals

Set annual retention goals for 5 or 10 years, based on Year 1 projects and expectations for repeat (1% - 3%)

Plan and Construct GI Projects

- Establish annual process to find projects and incorporate green infrastructure cost effectively
- Monitor, Measure, Record, Report

Recap

- 💧 Commit to Establishing Long-Term Measurable Goals
- 💧 Establish a Task Force
- 💧 Select the GIPS Project Area(s)
- 💧 Calculate the Baseline and Retention Capacity Values
- 💧 Identify and Design Green Infrastructure Features
- 💧 Establish Annual Goals

Grand Rapids Update

Vital Streets Policy – May 6, 2014

“Low impact design will be the default design approach for street, sidewalk and right-of-way repair, improvement and reconstruction and shall be used unless clear engineering difficulties prevent its use in order to enable the City to achieve a minimum of Stormwater Management Level C investment by FY2022 as depicted in the 2013 Stormwater Asset Management and Capital Improvement Plan.”

Sustaining Grand Rapid's Stormwater Investments

- 💧 Incentivizing LID
- 💧 Best Practices in Stormwater Management Opt-Out Systems Using LID
- 💧 Altering Local Codes and Ordinances in Grand Rapids to Include LID
- 💧 Establishing Measurable Goals and a Communication Strategy for Implementing LID in Grand Rapids

Recommended Ordinance Changes



Protect Natural Resources (Including Trees) and Open Space

- Remove or minimize the circumstances where Administrative Departures are permitted to reduce the buffer protection zone below 75 feet
- Develop mitigation requirements for disturbance or removal of street trees on public and private lands
- Encourage and incentivize site or stormwater plans to include a tree preservation requirement

Promote Efficient, Compact Development Patterns and Infill

- Amend code to differentiate between greenfield and infill development
- Add vegetated roofs or 100% stormwater retention onsite for density bonuses

Design Complete, Smart Streets that Reduce Overall Imperviousness

- Develop ordinances for Vital Streets design, including a specified funding mechanism
- Consider reducing new single-family driveway to a minimum width of nine feet and a maximum width of 10 feet with LID infiltration alternatives
- Require LID elements into street repairs and improvement projects, where site conditions allow, as defined by the City's Technical Reference Manual (see Section 4)
- Wherever possible, adopt stormwater green infrastructure retrofit standards for major street projects and require a minimum of 10% of all monies used for stormwater capital improvements be devoted to stormwater green infrastructure elements
- Adopt code provisions that would incentivize developers to utilize pervious materials in parking lots, alleys, or roads

Encourage Efficient Parking

- Expand parking lot landscaping requirements to include vegetation that will infiltrate stormwater
- Adopt standards that would require a minimum area of the parking lot to drain into landscaped areas through curb cuts
- Allow or require parking lot runoff to be managed through vegetated islands, swales, rain gardens, trees, or other approaches instead of a centralized drain
- Adopt requirements that would allow green infrastructure to be used as part of screening buffer requirements

Adopt Green Infrastructure Stormwater Management Provisions

- Encourage and incentivize developers to meet their stormwater requirements using green infrastructure practices where site conditions allow
- Encourage and incentivize long-term maintenance agreements on all installed LID practices

Thank You!

- 💧 A guidebook outlining this process is available on our website – www.americanrivers.org

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